Iranian J Publ Health, 2005, Vol. 34, No. 4, pp.1-7

Epidemiologic Feature of Thyroid Cancer Based on Cancer Registry Data System

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(Received 23 Feb 2004; revised 11 May 2005; accepted 20 Aug 2005)

Abstract

This study was undertaken to define the epidemiological aspects of thyroid carcinoma in Iran, an area of endemic iodine deficiency nearly until recently. The Tehran Cancer Institute Data System Registry (TCIDSR) was used to identify patients with different histological types of thyroid cancer (TC) in Iran. Data were analyzed from 438 thyroid cancer cases identified by the TCIDSR in 1998-99. Disease prevalence was calculated by age, time and place. The TCIDSR recorded 438 primary malignancies of the thyroid gland: papillary, follicular, medullary, and anaplastic carcinomas accounted for 67.1%, 10.7%, 5.3% and 4.3% of cases, respectively. The remaining 12.6% was classified as OD (other diagnoses). The prevalence of TC was the highest in Farsis population. The age range of patients was 8-85 yr. Mean patient age was 44.52± 17.03 yr (mean± SD) overall, 47.74± 18.10 yr in male patients and 43.04± 16.34 in female patients. Anaplastic (6.5% vs. 3.3%) and medullary (10.0% vs. 3.0%) cancers were more common in men than women. Against expectation for an iodine-deficient area, the frequency distribution of tumours in our study was closer to that seen in iodine-rich areas. Additional research on the risk factors for thyroid cancer-genetic, ethnic, geographic and environmental is needed to explain the high incidence of PTC overall, and among Farsis population in particular, in Iran.

Keywords: *Thyroid Cancer, Cancer registry data system, Iodine deficiency, Goitre, Iran*

Introduction

Thyroid cancer (TC) is the most common endocrine malignancy, with worldwide incidence rates that are generally lower than 3 per 100,000 for men and 5 per 100,000 for women (1–4). TC has four main histological types: papillary (PTC), follicular (FTC), medullary (MTC), and anaplastic (ATC). PTC is the most prevalent type, and is three times more common in women than men (2, 5). There is also marked geographic, ethnic, and temporal variation in incidence rates (3, 4). Genetic and environmental factors play a key role in modulating TC pathogenesis (3, 4). Longitudinal data from population- based registries show that the incidence of PTC has increased up to five-fold in a number of countries over the past 60 yr (4-7). TC shows considerable ethnic and geographic variation, and the highest incidence rates are reported in areas of high iodine intake (8). The overall prognosis for TC is worse, however, in endemic goitre regions, in comparison with regions with an adequate dietary iodine intake, perhaps because of the higher incidence of undifferentiated TC in iodine-deficient areas (9, 10). There is however, as yet no consensus on this matter (11). Goitre used to be endemic in Iran until the introduction of universal iodine

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supplementation ten yr ago (12, 13). There are difficulties, therefore, in assessing trends in the epidemiology of TC. We studied the epidemiology of TC at the Tehran Cancer Institute Data System Registry (TCIDSR) in 1998-99, based on 438 cases.

Materials and Methods

Information for the present study was obtained from the Tehran Cancer Institute Registry, which contains data on malignancies diagnosed in Tehran hospitals and referrals from all over Iran. All pathologists in Tehran are required by law to notify the relevant registries of any case of cancer they report on, with local registries reporting to the TCIDSR, which then records the data using 'Can.Reg' software. The 438 cases were assigned to one of five histological categories: PTC, FTC, MTC, ATC, and OD (Other Diagnoses), the latter group containing cases of TC with metastatic involvement of the thyroid, lymphoma, or benign neoplasia.

Information collected by the registry includes general patient information (age, gender, and district of residence), tumour site and histology, as defined by the 2nd edition of the International Classification of Diseases for Oncology (ICD-O) (14), and time of diagnosis. Qualitative variables were analysed with the Chi-squared test. All statistical analyzes were carried out using SPSSv10 software.

Results

We reviewed the records of 438 cases of thyroid cancer, within the framework of the Tehran Hospitals' Cancer Registration Plan. All cases referred from the provinces in 1998-99 were grouped according to sex, age, ethnicity, and histopathology. One hundred thirty nine (31.7%) of the patients were men, and 299 women (68.3%). Patient age ranged from 8 to 85 yr. Patients with anaplastic carcinoma presented at older age. Mean patient age was 44.52±17.03 yr. Male patients were significantly older than female patients (47.74± 8.10 vs. 43.04±16.34 yr; $P<0.008$).

Fig. 1 shows the number of cases in each age group, and indicates that most of patients have 30 yr old or more.

Table 1 shows the prevalence of cases by province of origin. The ethnic origin of 75.2% of cases was Farsi, with, at the other end of the spectrum, only 0.3% of cases were of Baluchi ethnic origin. After that, Turk patients accounted for 17.8% of cases, followed by Kurdish as 3.1%.

PTC accounted for 67.1% of cases, FTC for 10.7%, MTC for 5.3%, ATC for 4.3%, and OD classification for 12.6% of cases.

Table 2 and Fig. 2 show the distribution of different morphological subtypes of thyroid cancers by gender.

Table 1: Distribution of thyroid cancer cases by Province. Only provinces with registered cases have been included

Province	*Frequency*	*Percent*
E. Azerbaijan	4	1.5
W. Azerbaijan	6	2.3
Ardebil	2	0.8
Esfahan	5	1.9
Tehran	183	69.3
Khorassan	1	0.4
Zanjan	3	1.1
Semnan	1	0.4
Qazvin	7	2.7
Qom	6	2.3
Kordestan	5	1.9
Kermanshah	3	1.1
Golestan	1	0.4
Guilan	5	1.9
Lorestan	5	1.9
Mazandaran	13	4.9
Markazi	6	2.3
Hamadan	8	3.0
Total	264	100.0

Table 2: Thyroid Cancer in Iran by ICDOM Group and Gender

Gender	ICDOM	OD	Anaplastic				Follicular NOS	Papillary		Medullary		TOTAL
			Undiff. NOS	NOS	Giant Cell	Spindle Cell		NOS	Follicular variant	NOS	Amyloid stroma	
MALE	Count No.	14	4	3	2	0	11	75	16	12	2	139
	% within Gender	10.1	2.9	2.2	1.4		7.9	54.0	11.5	8.6	1.4	100
FEMALE	Count No.	41	7	2	0	1	36	176	27	8	1	299
	% within Gender	13.7	2.3	0.7		0.3	12.0	58.9	9.0	2.7	0.3	100
TOTAL	Count No.	55	11	5	2	1	47	251	43	20	3	438
	%Total	12.6	2.5	1.1	0.5	0.2	10.7	57.3	9.8	4.6	0.7	100

Undiff = undifferentiated; NOS= not otherwise specified; ICDOM= International Classification of Disease for Oncology-Morphology; OD= other diagnoses;

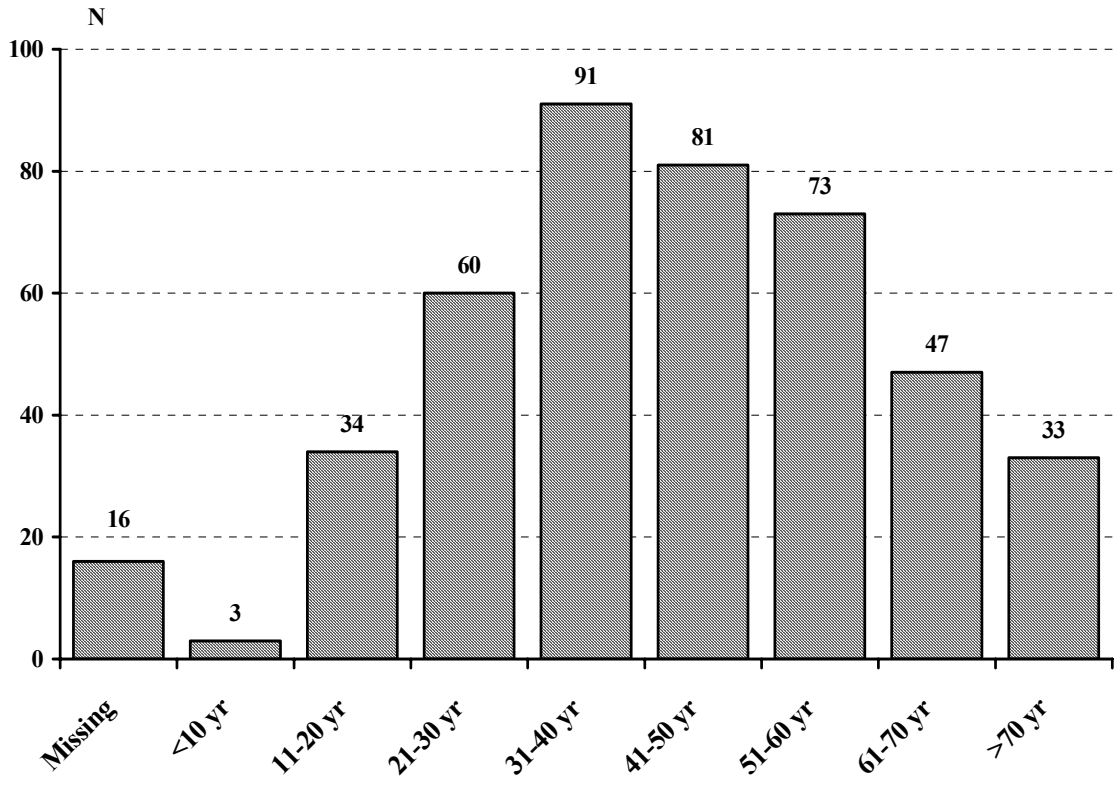

Fig. 1: Age distribution of thyroid cancer cases in Iran

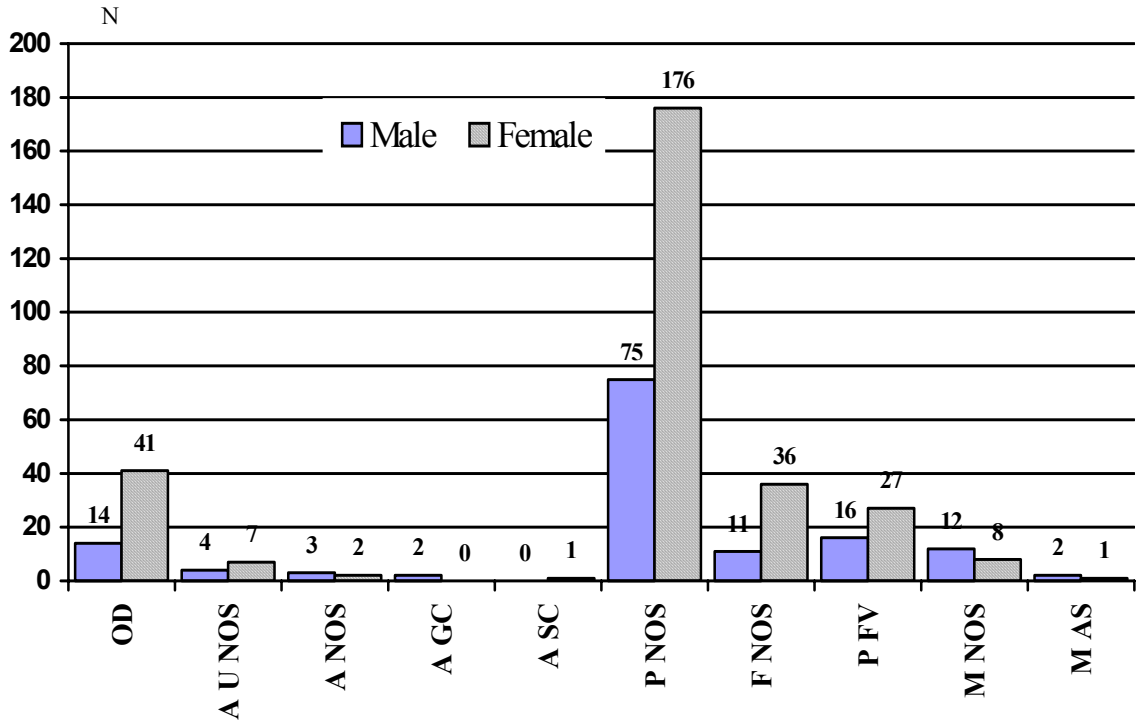

Fig. 2: Frequency by gender of ICD-O morphological subtypes in 438 patients with thyroid cancer

OD= other diagnoses; A= anaplastic thyroid carcinoma; U= undifferentiated; NOS= not otherwise specified; GC= giant cell; SC= spindle cell; P= papillary thyroid carcinoma; F= follicular thyroid carcinoma; FV= follicular variant; M= medullary thyroid carcinoma; AS = amyloid stroma

Discussion

This is an epidemiological survey of cases of thyroid cancer recorded by the Cancer Institute at Imam Khomeini Hospital in Tehran, using a data system registry. This project is part of a general survey of endocrine cancers being carried out in collaboration with the Endocrinology & Metabolism Research Centre (EMRC) of Tehran University of Medical Sciences. Given the importance of registry systems and Surveillance Epidemiology and End Results (SEER) datasets in epidemiological surveys, clinical trials and, ultimately, healthcare planning, it is vital to incorporate this approach into the general mindset of healthcare systems. As data registration systems are still in their infancy in Iran, errors are only natural along the way. The number of missing records in this study is significant, and the records that are present in the registry are in many ways flawed, sometimes through unforeseen circumstances rather than indifference. We must follow the example of countries more experienced than ourselves in this domain, the Scandinavians in particular: Sweden boasts registration coverage of 97 percent. For example, initial data entry in our study did not include either tumour stage and grade or the risk factor profile of patients. The original datasheets, however, contained all this information, correctly and accurately recorded. The data entry process therefore needs to be reformed. There are also many instances of the tumour ICD-O code being incorrectly recorded. One of the positive steps taken by the Cancer Institute has been to design the IARC-approved CAN.REG software. Unlike previous versions, the latest version of CAN.REG can operate in a Windows environment, greatly facilitating data entry.

A quality control (QC) step must be incorporated into the registration process in order to monitor the accuracy and data collection and entry. The QC plan is currently in its preliminary phase. Ultimately, it is by driving home the importance of data registration that public and private medical institutions will be compelled to act collectively and cohesively in this regard.

The female-to-male ratio in this study was 2.1:1, consistent with the female predominance reported elsewhere (11, 15-17). A higher proportion of men than women were affected by ATC, again agreeing with previous studies (11, 18). This may partly explain why thyroid cancer has a worse outcome in men. Patients with ATC were older than patients in the other groups. Similar results have been reported in other series (11, 15, 18, 19).

The relationship between iodine nutrition and thyroid carcinoma pathogenesis is complex (10, 20, 21). Epidemiological data show higher rates in populations with higher iodine intake (3, 4, 22). Improved iodine intake in previously iodine-deficient communities has also been associated with an increased incidence of PTC (11, 23). This so-called papillarization is characterized by an increase in the ratio of papillary to follicular cancers, a decrease in PTC size, and an attenuation of the malignant phenotype (23, 24). There is, however, no clear relationship between increased dietary iodine and higher total TC rates (23, 24). Iodine intake is associated with an increase in the incidence papillary and corresponding decrease in that of follicular TC (8, 25). Earlier reviews have reported an increased incidence of FTC in iodine-deficient areas, accounting for as much as 30-40% of all cases of TC in these areas (8, 12, 19). More recent studies support this trend (19, 25), which may be more obvious in men (21). Interestingly, following the introduction of iodine supplementation in iodine-deficient areas, the proportion of PTC has increased at the expense of ATC (11, 23, 26). This is confirmed by our findings, in which two-thirds of our cases were PTC. When we consider that Iran was an iodine-deficient country during the years in which the subjects of this study had sought medical care, this observation argues against a possible cause-and-effect relationship between iodine deficiency and follicular carcinoma (12, 13). The lower incidence of FTC may also explain the low incidence of ATC in our study (26).

Regarding the information itself, there are two points to make:

1. The homogeneity of the samples means that the findings of the study can be extrapolated to the general population.
2. Ten years ago, the government instituted a nationwide iodine supplementation programme, and its effect on the distribution of thyroid cancer in Iran must be studied, given the clear association between iodine status and thyroid cancer (12, 13, 27, 28).

Acknowledgments

We would like to express our gratitude to the people who helped us in the completion this project: MR Amini, N Poorpezeshk, S Aghakhani, GR Habibi, H Haerizadeh, R Heshmat, and Z Basaeri, as well as the staff of Tehran Cancer Institute.

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